I claim:

1. A process comprising:

(a) oligomerizing isobutylene in the presence of a sulfonic acid resin catalyst to produce a diisobutylene stream containing minor amounts of sulfur impurities; and

(b) contacting the diisobutylene stream with a large pore zeolite to produce a diisobutylene product having a reduced amount of sulfur impurities.

2. The method of claim **1** wherein the large pore zeolite has an average pore size from about 6 Angstroms to about 15 Angstroms.

3. The method of claim **1** wherein the large pore zeolite is zeolite X.

4. The method of claim **1** wherein the large pore zeolite is zeolite Y.

5. The method of claim **1** wherein the large pore zeolite is in the sodium form.

6. The process of claim **1** comprising the additional step of (c) hydrogenating the diisobutylene product having a reduced amount of sulfur impurities in the presence of a hydrogenation catalyst to form isooctane.

7. The process of claim **6** wherein the hydrogenation catalyst is a supported nickel catalyst.

8. A process comprising:

(a) oligomerizing isobutylene in the presence of a sulfonic acid resin catalyst to produce a diisobutylene stream containing minor amounts of sulfur impurities;

(b) contacting the diisobutylene stream with a large pore zeolite selected from the group consisting of zeolite X and zeolite Y to produce a diisobutylene product having a reduced amount of sulfur impurities; and

(c) hydrogenating the diisobutylene product having a reduced amount of sulfur impurities in the presence of a hydrogenation catalyst to form isooctane.

9. The process of claim **8** wherein the hydrogenation catalyst is a supported nickel catalyst.